

PROFITS IN FLAX

By

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IN the United States, to properly establish the flax industry there must be co-operation. It can hardly be said that the United States is a flax producing country, notwithstanding the cultivation of two million acres of flax for seed, which is sold to the oil mills. The growth of flax for seed, and its cultivation for fiber, are distinct propositions requiring totally different treatment as regards soil and culture, and, as far as fiber growth is concerned, producing widely different results. In the

culture for seed the ground is carelessly prepared, new land, turned from the sod often being used; the seed is sown thinly, at the rate of two or three pecks of seed to the acre, and the crop practically takes care of itself until time to harvest the well-ripened seed, the "straw," which is little more than small branching bushes, being short, coarse and woody, and deficient in proper spinning fiber.

When cultivated as a textile crop, from one and one-half to three bushels of seed per acre are sown upon land brought into the finest tilth, and a high state of fertility. The young plants are kept free from weeds, and the seed having been sown thickly, the stalks grow slender

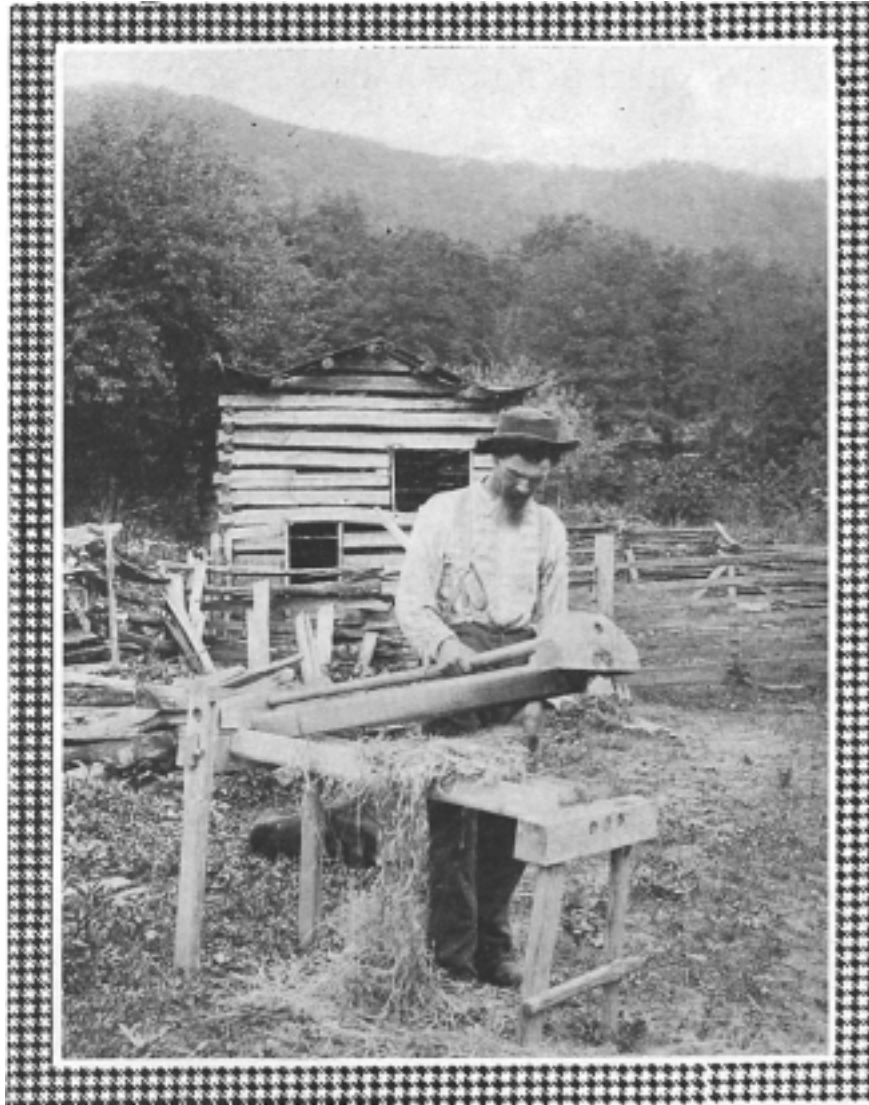


THE KIND OF WORK MEN HATE.

Harvesting flax on the shores of Puget Sound. The lack of a machine for pulling flax is an obstacle to its cultivation in this country. Neither our native farmers nor immigrants will bend their backs at this work if they can avoid it.

and spindling, sometimes reaching a height of three feet, although two, or two and a half feet, is the average length. As there is little branching the seed product is comparatively small, and

Something like the creamery system is essential to put the industry on a recognized basis—a division of labor which shall bring between the farmer and spinner a class of skilled workers



WHERE TIME SEEMS SCARCELY TO MOVE.
Breaking flax by hand in Virginia.

while the flax is usually harvested before the seed is fully ripened, it is always saved, and is worth quite as much per bushel as that from flax grown for seed only.

who will take the crop when grown, and make of it a stable product. This means small central factories established in flax growing localities, where the farmers will be able to make con-

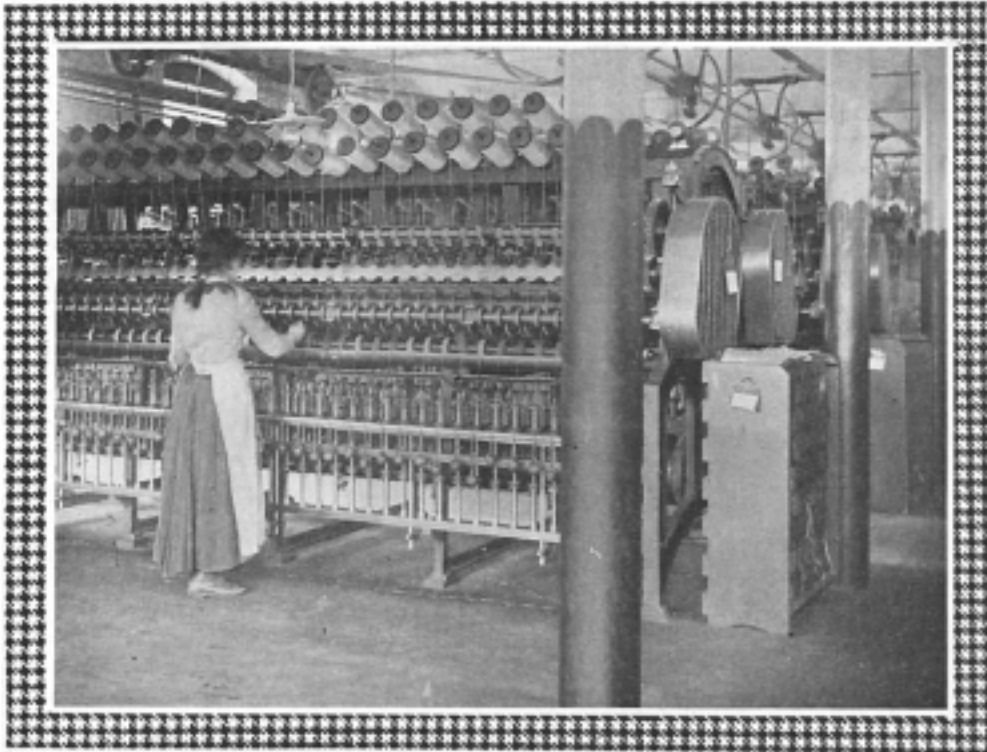
tracts to grow certain quantities of the straw, all subsequent operations to be performed under one direction, at the central mill. By such a system the farmers will be relieved of that part of the work requiring not only skill and technical knowledge, but more or less special capital. Twenty farmers in a community might produce twenty different grades of prepared fiber—if many did not make failures—while under the co-operative, or factory system, definite and uniform grades would result, and at the same time the farmers would be relieved from the necessity of finding a market. Canada finds flax culture profitable, and even in Mexico there is a small industry, the flax being grown for the home spinning mills. Good flax fiber can be produced in many portions of the United States and it has been shown that the better farm practice of this country, with the employment of high-grade labor-saving machinery and implements, and the tendency of the Yankee farmer to “get there” by short cuts, would equalize to a large degree the difference in farm wages between this country and Europe.

Some commercial flax is produced at the present time in the United States as small quantities are grown in the Northern Lake regions, and in Oregon, but the manufacturers rely almost wholly upon the regular and assured supply which comes from other countries. Yale, Michigan, is the center of a very respectable flax fiber industry that has been established many years, a very good quality of flax being produced. But the fact remains that until our farmers are able to guarantee something more than a small, intermittent, and doubtful supply, flax buyers will continue to purchase from European growers, with whom they will be able to place contracts a year ahead if desired. But there are other considerations to be



THE STEPS IN PREPARING FLAX FOR CLOTH.
Right to left—natural straw with seed; broken; scutched; hackled.

taken into the account. Unlike many cultural industries, the commercial growth of flax requires more than a mere planting and harvesting of the crop by individual farmers. After the crop has been grown other operations, requiring knowledge and skill to prepare the product and make it a marketable commodity, are necessary, and the farmers, working alone, are helpless to place the industry upon its feet. One of the obstacles to the cultivation of flax in this country is the lack of a machine for pulling the flax. In all flax-growing countries, where good practice prevails, the straw is pulled up by the roots in order to secure all the fiber that is in the stem, as well as to avoid a square end at the butt, which results when the straw is harvested with the sickle or reaper. A “streak” of prepared flax should taper at both ends. Neither our native farmers, nor foreign farmers who come to this country, will bend their backs to pull flax



YOU SKIP A CENTURY IN PASSING FROM VIRGINIA TO NEW JERSEY.
Dry spinning in a modern linen factory.

if they can by any possibility avoid so doing.

In a series of experiments conducted in the Puget Sound region of Washington flax straw was produced which, when subsequently retted—that is, steeped or softened in order to separate the fiber from the woody or waste portions—and prepared in Ireland by experts—two tons of straw having been exported for the purpose—gave grades of dressed line valued at from six cents to twenty-five cents per pound, or \$130 to \$500 per ton. Mr. Frank Barbour, who retted and prepared the fiber, speaking of the final results, expressed some surprise, as the success of the experiment was beyond his expectations. Commenting further, he stated his belief that under proper conditions it would be possible to build up in the West an American industry that would rival the great Belgian district of Courtrai. This is a strong statement, but through this experiment, and others, it has been proved over and

over again that, with such a co-operative system as I have outlined, this country can produce fine flax,—but the cold fact remains that the industry is yet a thing of the future.

The United States imported in one year nearly ten thousand tons of unmanufactured flax worth two and a half million dollars. The great bulk of these imports came from three countries, namely: Russia, Belgium and the United Kingdom. About one-third of the imported flax came from Great Britain; almost thirty per cent came from Belgium, though in later years a great deal of Flemish or Courtrai flax is sent to Ireland to be dressed, when, oddly enough, it becomes “Irish flax.” Belgian flax is the softest, finest, and lightest flax, as to color, grown in the world. Russia supplies this country with the cheaper grades of line, the Russian imports amounting to about twenty-five per cent of the whole. France, Italy and the Netherlands contribute a little, Germany

less than 500 tons, while from Canada was imported about 670 tons, for which our neighbor received \$145,000, in round numbers. The superiority of much of the Flemish flax is due to its being retted in the running water of the famous River Lys; and it is interesting to note that the center of the French flax industry is in the North, contiguous to Belgian territory, where the flax straw may be readily transported by rail to the River Lys, to be immersed in the turbid waters of that wonderful stream. Irish flax is

darker than the Flemish, much of it being retted in pools or bog-holes. Canada flax is also dark, and the same may be said of much of the Russian, though it comes in many shades, dependent upon the district where produced and the method of retting employed. Dutch flax is usually high grade

fiber. The prevailing custom in the United States has been to ret by spreading the straw over a meadow, this method being known as dew-retting. This system is the least satisfactory, as it gives a dark, gray flax, usually of low grade, and uneven and harsh in quality.

The process of retting requires from six to ten days, or longer, dependent upon the softness of the water, temperature and other conditions. A well-prepared "nature" retted flax is soft to the touch, has an oily feeling when handled, and an odor that is unmistakable to any flax expert. A prime reason why "quick retting" processes, so-called, such as chemical treatment, steam or hot water maceration, have never been fully successful, is that the qualities which give the "nature feel" are absent,—the

dressed line usually being harsh and dry, the fiber brittle and lacking in what the old Scotch flax men call "life."

Up to this point we have been considering chiefly the culture of flax and the steeping or retting of the straw. The next process is to pass the straw through a breaker which crushes and breaks down the woody portions so that when shaken much of the waste matter will fall away. To produce the "dressed line" all of the waste, or "chive" must be beaten out, leaving the fiber straight and

clean, and this operation is known as scutching. In olden times this was done by hand, the flax being held over the edge of a board and beaten, with a sharp down stroke by means of a thin-edged wooden paddle. The same operation is accomplished by machinery, though in the modern scutching ma-

chines the wooden paddle has been superseded by other devices. After scutching the flax becomes a commercial product.

Flax manufacture is a very old industry in the United States, probably as old as the country itself, for in earliest colonial times, and almost down to the present day, for that matter, flax has been grown and manufactured as a household industry. Within fifteen years the writer has seen flax spun and woven in the Virginia mountains by venerable women who had lived their peaceful lives beyond the shriek of the locomotive whistle, and who wrought with the spinning wheel and the cumbersome hand loom precisely as the pretty Dorothys and Priscillas spun and wove in good old colonial times.



DRYING YARN IN THE OPEN AIR.
Great long sheds are used for this purpose.

As the greater portion of fiber that comes to the mills is scutched flax, the hackling or combing may be considered the first operation in manufacture. By this means all tangled, broken or short length fiber is removed, the combings being known as tow. Sometimes the fiber is subjected to three or more hacklings which diminishes the weight of the hank of flax under treatment, though its value per pound is increased. In our illustration of a flax hackler the operation is fully shown, together with a hank of the glossy, finished product, and the mass of combings or tow. While much of the flax that is manufactured is hand-combed in this manner, the work is also done by machinery, though it is doubtful if any mere machine will ever do it with the nicety of these old skilled operators who can tell the quality of a bit of flax with their eyes shut.

The first operation in spinning is called laying the flax. The streaks or handfuls of combed flax are laid parallel from a feed table, the tapering ends overlapping upon each other to form a continuous rope of loose fiber. This explains why it is better to pull the straw when the flax is harvested rather than to cut it with the reaper. In cut flax the root end is always square, or "butted," and in laying the flax, in the first operation of manufacture, the butted ends prevent the forming of an even sliver, and therefore is apt to make an uneven yarn. Passing between two fluted rollers the laid flax traverses a series of hackles,—small steel teeth fixed to an endless belt. Passing over the hackles the sliver is caught by a pair of drawing rollers which travel a little faster than the first pair, or



HACKLING FLAX—COMBING IT OUT BY HAND.

retaining rollers. By this action the flax is not only drawn out, but the filaments of flax are separated by the hackles as the sliver moves forward, and as the two sets of rollers are just a little farther apart from each other than the length of the flax fiber the filaments are not only straightened but the sliver is attenuated. Leaving the second pair of rollers, in the form of a flat ribbon fiber, the sliver runs off into tall metal cylinders at the rear of the drawing frame.

This drawing action is repeated over and over again in the roving machines. Several slivers are now combined and run through the next machine, the drawing action still further attenuating the strand of fiber, which is now twisted gently and finally wound upon bobbins. After the fiber has been drawn down as fine as required for the subsequent operation of spinning, the bobbins go to the spinning frame, where they are placed upon a series of pins, set at an angle, at the top of the frame. The roving now passes through two sets of rollers as before, the second pair moving at a greater speed than the first pair, and is carried down through the throttle of the spindle, over the flyer, and onto the spinning bobbin. This is dry spinning. In wet spinning the roving passes through steam-heated water, which further subdivides the filaments and combines them better with the thread.

Subsequently the spun yarn is reeled off into hanks, after which it is bleached, or dyed, and dried in the open air. It is now ready to be wrought into the many kinds of threads, or twines or woven fabrics which form the particular specialties of the manufacture.